units of measures of capacity had been previously established in this country at different periods. In Magna Charta, three such units are recited, "there shall be throughout our realm, one measure of wine, one measure of ale, and one measure of corn." Of these, the most ancient known was the Winchester corn bushel, of the capacity of about 2150·42 cubic inches, together with the Winchester corn gallon of 272¼ cubic inches. We have no record of any other standard measures of capacity being actually constructed, until the standard ale gallon of 282 cubic inches was added by Queen Elizabeth, and the standard wine gallon of 231 cubic inches by Queen Anne. All these old standard measures were discontinued as legal measures in 1824, and the new imperial standard gallon of 272·274 cubic inches, and the bushel of 2218·191 cubic inches, constructed and verified under Capt. Kater's superintendence, have since continued to be the standard units of imperial measure for liquids and for dry commodities.

The Exchequer standards of the imperial gallon and bushel formed part of the complete series of secondary standards constructed and accurately verified under Kater's superintendence in 1824. These standards, together with other secondary standards, subsequently legalised, have served for regulating all the commercial weights and measures of Great Britain and her colonies and dependencies from 1824 up to the present time. The Exchequer standards were transferred to the Standards Department of the Board of Trade in pursuance of the Standards Act, 1866.

H. W. CHISHOLM

(*To be continued.*)

THE FRENCH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE session of this young Association which has just been concluded at Lyons appears to have been altogether successful, and according to the Reports read the Association is in an exceedingly prosperous condition, both as to number of members, income, and the carrying out of the scientific aims which it has in view. The number of members who attended the Lyons Congress was very satisfactory. The capital fund at the end of 1872 was 136,464 francs, and the income for 1873 is expected to be 24,000 francs. One of the aims of the Association is to give an impulse to Science in the provinces, and, as we recorded some time ago, the members of the Association resident about Bordeaux have formed a local association, and it is hoped a similar result will follow in the case of each town where the yearly meetings are held. The Association has received invitations for its next session from various French cities, and it has been decided to hold the meeting of 1874 at Lille. M. Wurtz was elected President for the ensuing year.

The accounts which have come to hand are mainly concerned with the work done in the Medical Section. Last week we gave a few extracts from the Presidential Address of M. De Quatrefages, and shortly we hope to be able to give a *résumé* of the work done in the various sections, as well as of the more important public lectures. Meantime we shall give a brief sketch of the general work which has been done.

In the general meetings, Dr. Blanc, an Indian military surgeon, read an important paper "on the means of arresting the propagation of cholera," founded on experiments made by himself. M. A. Gaudry, Professor at the Jardin des Plantes, Paris, gave a lecture on a botanical subject. Dr. Bertillon also gave a lecture on "Demography," *i.e.* the Natural History of Society. M. de Lesseps talked in a familiar and pleasant way of the proposed railway across Central America. M. F. Papillon read a paper on the connection between the Sciences and Metaphysics, and the Abbé Ducrost gave a lecture on the Prehistoric Station of Solutré.

The part of the Congress which is undoubtedly the most attractive consists in the excursions and the public lectures; the former interest strangers, and the latter, members. Besides the special excursions organised by certain sections and parties of members, there have been three general excursions—one to the prehistoric station of Solutré; a second to the sides of the plateau of Les Dombes; a third to the mines and furnaces of Voulte-sur-Rhône, in Ardèche, and a fourth, which set out last Friday and was to last for two days, to Geneva and the shores of its lake.

There have been three public lectures: the first was given by M. Karl Vogt, of Geneva, on Volcanoes; the second by M. Janssen, on the Physical Constitution of the Sun; and the third by M. Aimé Girard, on the Recent Progress of Industry.

NOTES

THE final arrangements for the Bradford meeting of the British Association are as follows:—The first General Meeting will be held on Wednesday, Sept. 17, at 8 P.M. precisely, when Dr. Carpenter, LL.D., F.R.S., &c., will resign the Chair, and the President-Elect, Prof. W. A. Williamson, F.R.S., will assume the presidency, and deliver an Address. On Thursday evening, Sept. 11, at 8 P.M., a Soiree; on Friday evening, Sept. 19. at 8.30 P.M., a discourse by Prof. W. C. Williamson, F.R.S., of Manchester, on Coal and Coal Plants; on Saturday evening, Sept. 20, a Lecture on Fuel to working men only, by Mr. Siemens, F.R.S.; on Monday evening, Sept. 22, at 8.30 P.M., a Discourse on Molecules, by Prof. Clerk Maxwell, F.R.S.; on Tuesday evening, Sept. 23, at 8 P.M., a Soiree; on Wednesday, Sept. 24, the concluding General Meeting will be held at 2.30 P.M., and in the evening a Grand Concert will be given in St. George's Hall, at 8 P.M. The excursions on Thursday, Sept. 25, will be to Harrogate, Ripon, Studley, Bolton Abbey, Gordale Scarr, Malham, Clapham Caves, Settle Caves, and Ingleboro'. Lists and prices of lodgings, and other general information will be given, on application at the Local Secretaries' Office, Bradford.

IT is said that a portion of the immense wealth of the late eccentric Duke of Brunswick is to be devoted to the founding of a Faculty of Medicine in Geneva.

THE King of Prussia has conferred on Prof. Helmholtz the Order of Merit for Science and Art.

THE October number of *Petermann's Mittheilungen* will contain an account of Professor Nordenskiöld's Arctic Expedition during 1872-3, in the direction of Spitzbergen, which has not, geographically, been very successful. The steamer *Solhem* reached Tromsö on August 6, and the following telegram of that date has been received from Prof. Nordenskiöld:—"Just arrived here, all well. My resolution to undertake another ice-journey towards the north after the sledge-journey round North-east-land, has been rendered impracticable through want of provisions, which has compelled us to return. Instead of this we have undertaken extensive deep-sea dredgings as well as botanical, magnetic, and geological researches. I bring with me, besides other from various formations, very important collections of Miocene flora, as well as of two formations which belong to an older geological period hitherto altogether unknown in the Polar regions. These collections throw new light upon the prevailing flora and the climate of former periods, as well as upon the changes which these have undergone."

ACCORDING to the report of the Meteorological Department an earthquake occurred at Nottingham at ten minutes to seven o'clock on Friday morning last.

Prof. Palmieri stated in the Neapolitan papers on Aug. 12, that, according to observations on Vesuvius, new earthquakes may be expected.

The Berlin medical journals record the death, from cholera, on August 20, of Dr. Otto Obermeier. His death is supposed to have been the immediate consequence of his intense devotion to Science. Having too great confidence in his power of resisting infection, in consequence of having not taken fever during his investigations on that disease, he kept in his bedroom pathological specimens taken from persons who had died of cholera, and also portions of their excreta; and it is believed that in this way he became infected. According to one account, he injected some blood from cholera patients into his own vessels. He was so devoted to his inquiry that, after he had become aware of the condition in which he was, he made some microscopic examinations on his own blood. His death occurred after an illness of seven hours, in the thirty-first year of his age.

The late Mr. John Stuart Mill has left property to the amount of 14,000*l.* Of this he has left to any one university in Great Britain or Ireland that shall be the first to open its degrees to women, 3,000*l.*; and to the same University a further sum of 3,000*l.* to endow scholarships for female students exclusively. His copyrights he bequeaths in trust to Mr. John Morley, to be applied in aid of some periodical publication which shall be open to the expression of all opinions, and which shall have all its articles signed with the names of the writers.

The planet No. 131, discovered by Prof. Peters, has been named Vala.

No. 1,952 of the *Astronomische Nachrichten* contains the following ephemeris of the one discovered by M. W. Tempel at Milan on July 3 last:—

1873.	R.A. h.	m.	s.	South Declination. °	′
Sept. 4	2	7	17	14	38
,, 8	2	9	0	15	26
,, 12	2	9	58	16	12
,, 16	2	10	15	16	54
,, 20	2	9	52	17	31
,, 24	2	8	49	18	6

This ephemeris is by Signor J. V. Schiaparelli; it is for 0 h. Milan time. The same number of the *Astronomische Nachrichten* contains a short article upon this comet by Mr. L. Schulhof, assistant at the Observatory of Vienna, wherein he says, "It does not admit of doubt that we have here to do with a periodic comet of short revolution, the exact calculation of the orbit of which I shall enter upon without delay."

Two new comets have been recently discovered; the one by M. Henry, at Paris, the other by M. Borelly, at Marseilles.

M. Stephan, the Director of the Marseilles Observatory, has succeeded in re-finding Brorsen's comet. The correction of Mr. Plummer's ephemeris is as follows:—

$$\text{R.A.} + 2^{h}\ 7^{m}$$
$$\text{Dec.} - 15'\ 8''$$

We understand that the Board of Examiners for the mining district of South Durham, Whitby, and Cleveland allow candidates for examination, under the New Mines Regulation Act, to count one or two years passed at the College of Physical Science in Newcastle the same as the like period served under indentures to a mining engineer, or as one or two years' experience in a mining office. This offers a very great advantage to young men who intend to devote themselves to the profession of mining engineering.

The following candidates have been successful in obtaining Royal Exhibitions of 50*l.* per annum for three years and free admission to the courses of instruction under the Science and Art Department:—Royal School of Mines, Jermyn Street, London: William Hewitt, aged 21, teacher; C. S. Fleming, 20, assistant teacher; Samuel Barratt, 22, assistant teacher. Royal College of Science, Dublin: Henry Louis, 17, student; Robert H. Reilly, 18, student; Thomas Arnall, 22, rule-maker.

A sum of 500*l.* having been placed at the disposal of the Council of the Society of Arts, through Sir William Bodkin, by a gentleman who does not wish his name to appear, for promoting, by means of prizes or otherwise, economy in the use of coal for domestic purposes, the Council have decided to offer the following prizes: Five prizes for carrying out the purpose of the donor, each prize to consist of the Society's medal and 50*l.* Testing-rooms will be provided, in which the various competing articles may be tested in sucession, each competitor having allotted to him in turn a room and chimney, for a limited period, where he may fix his apparatus for the purpose of its being tested by the judges appointed by the Society of Arts, the same to be removed when directed by the judges; such fixing and removal to be at the cost of the competitor. The competing articles must be delivered at the London International Exhibition, South Kensington, on December 1, 1873, with a view to their being tested, and subsequently shown in the Exhibition of 1874.

The last number of the *Society of Arts' Journal* contains a Report on Cooking Apparatus at the International Exhibition, by Mr. G. W. Yapp.

It is stated that a new Literary Review will be published at the beginning of next year, covering the same ground as the *Athenæum*, the *Academy*, and *Notes and Queries.* It will supply a regular weekly account of English and foreign literature, science, and learning, the fine arts and archæology, music, and the drama. It is added that the proprietors have purchased all rights in the *Fortnightly Academy Journal*, and intend to make that the scientific and learned part of the new paper, though whether under the name of the *Academy* or some other name is not yet determined.

A life of Claparède, with an admirable portrait, precedes his posthumous work, entitled "Recherches sur la structure des Annélides Sédentaires," which is published as the new volume of the "Memoires de la Société de Physique de Genève."

We have received a little pamphlet containing a very interesting account, by Mr. J. Logan Lobley, of the excursion of the Geologists' Association to the Malvern district during the 21st and five following days of last month.

We have received Reports of the meetings of the Eastbourne Natural History Society for April 18 and May 23. At the former meeting, a paper by Miss A. Woodhouse was read on *Odoxa moschatellina*, and the Rev. A. K. Cherril read one "On Mosses." At the latter meeting the following papers were read:—"The Orchidaceæ, with special reference to the species found near Eastbourne," by Miss Hall and Miss A. Woodhouse; *Ceratostoma Helvellæ*, by C. J. Muller; and "The Alluvial Beds of the Wish," by the Rev. E. S. Dewick, F.G.S.

A correspondent writes us that he has just obtained a specimen of quartz with gold found at Wanlockhead, Dumfriesshire. It is a fragment of a detached mass of quartz which weighed about ten pounds, throughout which gold was diffused. Gold has long been collected from the sand of some of the rivulets at Wanlockhead and Leadhills, but no instance was before known of gold having been found in its matrix. The specimen which our correspondent has contains about as much gold as might be equal to the third or fourth of a sovereign, along with brown iron ochre diffused over one of the surfaces of the quartz.

A DESPATCH from Havana, dated August 19, states that late advices from Lima and Peru report a serious accident had occurred sixty miles from that city. A body of earth, estimated at 10,000,000 cubic yards, fell from a mountain side into a valley, severely injuring a number of persons, and damming up a river, the water of which had risen 109 feet above its usual height. Engineers were of opinion that the water would soon burst its barriers, when it would rush towards Lima, sweeping everything before it, and submerging the lower portion of the city. Several towns in Chili had been greatly damaged by earthquakes.

AS the result of a recent careful study of the drug *Pareira brava*, Mr. Daniel Hanbury has discovered that, instead of its being obtained from *Cissampelos pareira*, of the natural order *Menispermaceæ*, the genuine *Pareira brava* is the stem and root of a plant which he has identified with *Chondrodendron tomentosum* of Ruiz and Pavon. The drug of English commerce, however, is mostly of larger size than the root of *Chondrodendron* and is of doubtful origin, the structure of the wood being also that of the order *Menispermaceæ*.

UNDER the title of "On Coal at Home and Abroad," Messrs. Longman have recently published in one volume the following three articles, contributed to the *Edinburgh Review* by the Rev. J. R. Leifchild :—1. Consumption and Cost of Coal; 2. On the Coalfields of North America and Great Britain; 3. Fatal Accidents in Coal Mines. The republication of these papers at the present time is very opportune; they will be found to contain a great deal of information on the all-important "Coal question," as well as many interesting details concerning the working of coal mines and the character and condition of the miners.

ZOOLOGISTS will find in Dr. Theodore Gill's "Synoptical Tables of Characters of the Mammalia," prepared for the Smithsonian Institution of Washington, an excellent, concise, and accurate description of the characters of the families of the Mammalia, in a form more scientific and manageable than any yet published, at the same time that the merits of the most modern suggestions are fully weighed. The biography of the subject is also exhaustively treated.

THE Brighton Aquarium is an institution which all biologists undoubtedly look to as one from which much valuable information may be obtained on points connected with the habits and peculiarities of the animals which it has such advantages in retaining. The communications made public by its "Consulting Naturalist," however, are of a character very different from what we should expect from one so favourably placed. A fresh arrival is thus announced :—"One of the funniest little 'cusses' ever turned out of Nature's workshop, in the shape of a seal, made a bow to the public in the Brighton Aquarium a few days ago." This is followed, later on, by a *quasi* advertisement of the concert given in the building, in which the seal is playfully made to do duty as the butt for pun and slang quotation.

THE additions to the Zoological Society's Gardens during the past week include two Persian Sheep (*Ovis aries*), presented by Mr. W. H. Shirley; a Diamond Snake (*Morelia spilotes*) from New South Wales, presented by Mr. H. Frieland; two Robben Island Snakes (*Coronella phocarum*), presented by the Rev. G. H. Fisk; two Chubb (*Leuciscus cephalus*) and a Barbel (*Barbus vulgaris*) presented by Mr. E. S. Wilson; two Ring-tailed Lemurs (*Lemur catta*) from Madagascar; a King Parakeet (*Aprosmictus scapulatus*) from New South Wales; a Black Cuckoo (*Eudynamys orientalis*) from India, purchased; a Weeper Capuchin (*Cebus capucinus* and a White-throated Sapajou (*C. hypoleucus*) from America, deposited.

A POSSIBLE NEW METHOD OF ELECTRICAL ILLUMINATION

IT will be in the recollection of the readers of the *Journal*, that, in April last, an analogy was pointed out between sunlight and the electric light, and that certain conditions were therein indicated as being most favourable to that particular development of light which would best bring out the separation of the power producing the light from the place of its manifestation. Those conditions were the employment of magneto-electricity, and the use of a closed incandescent conductor in an atmosphere which would not oxidise or otherwise affect the durability of the light-producing material. From the quotation from the Russian paper *Golos* which follows, it will be seen that the results anticipated are even now in the course of realisation, and all that practical men can do is, to wish the plan the success it seems to deserve, and to wait the result of the further exhibitions of its power in London and other places more accessible to the Western nations than St. Petersburg :—

"On Tuesday the 8-20 of May, a most interesting trial was made for the first time in public at the Admiralty House, St. Petersburg, under the auspices of Messrs. S. A. Kosloff and Co., the proprietors of the patent, of a new system of lighting by electricity, the invention of Mr. A. Ladiguin, of that town.

"Owing to the restricted space in the hall made use of on this occasion, the number of spectators was necessarily limited, but still they consisted of more than a hundred specialists from different countries, representatives of science, honourable visitors, and many reporters, who were all deeply interested, and unanimously decided that the trial was really successful.

"Up to the present time, as is well known, the electric light has been used only for lighthouses, as an electric sun illumination for signals, or on the stage, where a strong light may be required without regard to cost; but thus far it has been quite impossible to employ it for lighting streets or houses.

"By the old method the electric spark was passed between two points of charcoal, each attached to a copper wire connected with an electro-magnetic machine.

"The disadvantages attending this mode consisted in the facts that, for each light a separate machine was required, and that the light so obtained, although very powerful, was impossible to be regulated, besides being non-continuous, owing to the rapid consumption of the charcoal points from exposure to air.

"All these difficulties Mr. A. Ladiguin has tried and apparently overcome most successfully.

"By his newly-invented method, only one piece of charcoal or other bad conductor is required, which being attached to a wire connected with an electro-magnetic machine is placed in a glass tube, from which the air is exhausted, and replaced by a gas which will not at a high temperature combine chemically with the charcoal. This tube is then hermetically sealed, and the machine being set in motion by means of a small steam-engine, the charcoal becomes gradually and equally heated, and emits a soft, steady, and continuous light, which, by a most simple contrivance, can be strengthened or weakened at the option of those employing it; its duration being dependent solely on the electric current, which of course will last as long as the machine is kept in motion.

"Taking into consideration the fact that one machine, worked by a small three-horse power engine, is capable of lighting many hundreds of lanterns, it is evident what an enormous advantage and profit could be gained by the illumination of streets, private houses, public buildings, and mines with the new electric light. In the latter it must prove invaluable, as no explosion need ever be feared from it, and these lanterns will burn equally as well under water as in a room.

"Without mentioning the many advantages this mode of illumination has over gas, which by its unpleasant odour and evaporation is slowly poisoning thousands of human beings, and from which explosions are frequent, we can state that by calculations made, this electric light can be produced at a fifth of the cost of coal gas.

"We hope shortly to place before the public more complete particulars, as well as reports of further experiments which are proposed to take place in Vienna, Paris, and London.'

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* From the *Journal of the Society of Arts*.